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SCIENCE

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ON MODIFICATION AND VARIATION.*

UP to a date still comparatively recent, the transmission to offspring, in greater or less degree, of those modifications of habit or structure which the parents had acquired in the course of their individual lifetime, was generally accepted. Lamarck is regarded as the intellectual father of the transmissionists. In his 'Histoire Naturelle' he said: "The development of organs and their power of action are continually determined by the use of these organs." This is known as his third law. In the fourth he insisted on the hereditary nature of the effects of such use. "All that has been acquired, begun or changed," he said, "in the course of their life is preserved in reproduction and transmitted to the new individuals which spring from those which have experienced the changes."

Darwin accepted such transmission as subordinate to natural selection, and attempted to account for it by his theory of pangenesis. According to that hypothesis all the component cells of an organism throw off minute gemmules, and these and their like, collecting in the reproductive cells, are the parental germs from which all the cells of the offspring of that organism are developed. This theory, here given in briefest outline, came in for its full share of

* Being a chapter from a forthcoming work on *Habit and Instinct* communicated at the request of Prof. Henry F. Osborn.